

associated with the call origin, the identity of the caller may be determined by gathering a spoken utterance from the caller and comparing it with stored speech patterns for each of the individuals in turn, selecting the most likely candidate that matches with a certain degree of confidence.

The CLI may also be used to access a store relating speech recognition models to the origin of the call. These speech models may then be loaded into the stores used by the speech recogniser. Thus, a call originating from a cellular telephone, for example, may be dealt with using speech recognition models trained using cellular speech data. A similar benefit may be derived for regional accents or different languages in a speech recognition system.

What is claimed is:

1. A speech recognition apparatus comprising:
 - a store of data containing entries to be identified and information defining for each entry a connection with a word of a first set of words and a connection with a word of a second set of words;
 - speech recognition means; and
 - control means operable:
 - (a) to control the speech recognition means to identify, by reference to recognition information for the first set of words, as many words of the first set as meet a predetermined criterion of similarity to first received voice signals;
 - (b) upon such identification, to compile a list of all words of the second set which are connected with entries connected also with the identified word(s) of the first set; and
 - (c) to control the speech recognition means as to identify, by reference to recognition information for the second set of words, at least one word of the list which resembles second received voice signals.
2. A speech recognition apparatus as in claim 1, in which:
 - the speech recognition means is operable upon receipt of the first voice signal to generate for each identified word a measure of similarity with the first voice signal, and
 - the control means is operable to generate for each word of the list a measure obtained from the measures for the relevant words of the first set, and
 - the speech recognition means is operable upon receipt of the second voice signal to perform the identification of one or more words of the list in accordance with a recognition process weighted in dependence on the measures generated for the words of the list.
3. A speech recognition apparatus as in claim 2 in which:
 - the control means is operable to weight the measure for each word of the list by a factor dependent on the number of words of the second set which are connected with entries connected also with the relevant identified word of the first set.
4. A speech recognition apparatus as in claim 2 in which:
 - the control means is operable to omit from the list those words of the second set having a measure below a predetermined threshold.
5. A speech recognition apparatus as in claim 1 in which:
 - the apparatus includes a store containing recognition data for all words of the second set, and
 - the control means is operable following the compilation of the list and before recognition of the words, of the list, to mark in the recognition data store those items of data therein which correspond to the words not in the list or those which correspond to words which are in the list,

whereby the recognition means may ignore all words so marked or, respectively, not marked.

6. A speech recognition apparatus as in claim 1 in which: the control means is operable following the compilation of the list to generate recognition data for each word of the list.

7. A speech recognition apparatus as in claim 1 in which: the control means is operable to select for output entries defined as connected both with an identified word of the first set and an identified word of the second set.

8. A speech recognition apparatus as in claim 1 in which: the store of data also contains information defining for each entry a connection with a word of a third set of words, and

the control means is operable:

(d) to compile a list of all words of the third set which are connected with entries also connected both with an identified word of the first set and an identified word of the second set; and

(e) to control the speech recognition means to identify, by reference to recognition information for the third set of words, at least one word of the list which resembles third received voice signals.

9. A speech recognition apparatus as in claim 1 including: means to store at least one of the received voice signals, the apparatus being arranged to perform an additional recognition process in which the control means is operable:

(a) to control the speech recognition means to identify, by reference to recognition information for one set of words, a plurality of words of that set which meet a predetermined criterion of similarity to the respective received voice signals;

(b) to compile an additional list of all words of another set which are connected with entries connected also with the identified words of the one set; and

(c) to control the speech recognition means to identify, by reference to recognition information for the other set of words, at least one word of the said additional list which resembles the respective received voice signals.

10. A speech recognition apparatus as in claim 9 including:

means to recognise a failure condition and to initiate the said additional recognition process only in the event of such failure being recognised.

11. A speech recognition apparatus as in claim 1 further comprising:

a telephone line connection; and

means responsive to receipt via the telephone line connection of signals indicating the origin or destination of a telephone call to access stored information identifying a subset of at least one of the said sets of words and to restrict to that subset the operation of the speech recognition means for that set.

12. A telephone information apparatus comprising:

a telephone line connection;

a speech recogniser for recognising spoken words received via the telephone line connection, by reference to recognition data representing a set of possible utterances; and

means responsive to receipt via the telephone line connection of signals indicating the origin or destination of a telephone call to access stored information identifying a subset of the set of utterances and to restrict the recogniser operation to that subset.

13. Apparatus as in claim 12, in which the apparatus includes:

a store containing recognition data for all words of the sets, and
the control means is operable to mark in the recognition data store those items of data therein which correspond to the words not in the subset or those which correspond to words which are in the subset,
whereby the recognition means may ignore all words so marked or, respectively, not marked.

14. Apparatus as in claim 12, in which: the control means is operable to generate recognition data for each word of the subset.

15. A telephone apparatus comprising:

a telephone line connection;
a speech recogniser for determining or verifying the identity of the speaker of spoken words received via the telephone line connection, by reference to recognition data corresponding to a set of possible speakers; and
means responsive to receipt via the telephone line connection of signals indicating the origin or destination of a telephone call to access stored information identifying a subset of the set of speakers and to restrict the recogniser operation to that subset.

16. A telephone information apparatus comprising:
telephone line connection;

a speech recogniser for recognising spoken words received via the telephone line connection, by reference to one of a plurality of stored sets of recognition data; and
means responsive to receipt via the telephone line connection of signals indicating the original or destination of a telephone call to access stored information identifying one of the sets of recognition data and to supply this set to the recogniser.

17. A telephone information apparatus as in claim 16 in which the stored sets correspond to different languages or regional accents.

18. A telephone information apparatus as in claim 16 in which at least two of the sets correspond to the characteristics of different types of telephone apparatus.

19. A telephone information apparatus as in claim 18 in which one of the sets corresponds to the characteristics of a mobile telephone channel.

20. A speech recognition apparatus comprising:

a store defining a first set of words;
a store defining a second set of words;
a store containing entries to be identified;
a store containing information relating each entry to a word of the first set and to a word of the second set;
speech recognition means operable upon receipt of a first voice signal to identify as many words of the first set as meet a predetermined recognition criterion;
means to generate a list of all words of the second set which are related to an entry to which the identified word(s) of the first set is also related; and
speech recognition means operable upon receipt of a second voice signal to identify at least one word of the list.

21. A recognition apparatus comprising:

a store defining a first set of patterns;
a store defining a second set of patterns;
a store containing entries to be identified;
a store containing information relating each entry to a pattern of the first set and to a pattern of the second set;

recognition means operable upon receipt of a first input pattern signal to identify as many patterns of the first set as meet a predetermined recognition criterion;

means to generate a list of all patterns of the second set which are related to an entry to which an identified pattern of the first set is also related; and

recognition means operable upon receipt of a second input pattern signal to identify at least one pattern of the list.

22. A speech recognition apparatus comprising:

(i) a store of data containing entries to be identified and information defining for each entry a connection with a signal of a first set of signals and a connection with a word of a second set of words;

(ii) means for identifying a received signal as corresponding to as many of the first set as meet a predetermined criterion;

(iii) control means operable to compile a list of all words of the second set which are connected with entries connected also with the identified signal of the first set; and

(iv) speech recognition means operable to identify, by reference to recognition information for the second set of words, at least one word of the list which resembles received voice signals.

23. A speech recognition apparatus as in claim 22 in which:

the first set of signals are voice signals representing spelled versions of the words of the second set or portions thereof, and

the identifying means includes the speech recognition means operating by reference to recognition information for the said spelled voice signals.

24. A speech recognition apparatus as in claim 22 in which:

the first set of signals are signals consisting of tones and the identifying means is a tone recogniser.

25. A speech recognition apparatus as in claim 22 in which:

the first set of signals are signals indicating the origin or destination of the received signal.

26. A method of identifying entries in a store of data by reference to stored information defining connections between entries and words, said method comprising:

(a) identifying one or more of the said words as present in received voice signals;

(c) compiling a list of those of the said words connected with entries connected also with the identified words; and

(c) identifying at least one of the words of the list as present in the received voice signals.

27. A speech recognition apparatus comprising:

a) a store of data containing entries to be identified and information defining for each entry a connection with at least two words;

b) a speech recognition means able to identify by reference to stored recognition information for a defined set of words, at least one word or word sequence which meets some predefined criterion of similarity to a received voice signal;

(c) a control means operable:

i) to compile a list of words which are connected with entries connected with a word previously identified by the speech recognition means; and

ii) to control the speech recognition means to identify, by reference to recognition information for the com-

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piled lists, at least one word or word sequence which resembles a further received voice signal.

28. A method of speech recognition by reference to a stored set of words to be recognised, said method comprising

- (a) receiving a speech signal;
- (b) storing the speech signal;
- (c) receiving a second signal;
- (d) compiling a list of words, being a subset of the set of words, as a function of the second signal;
- (e) applying to the stored speech signal a speech recognition process so as to identify, by reference to the list at least one word of the subset.

29. A method as in claim 28 in which the second signal is also a speech signal.

30. A method as in claim 29 including the step of: recognising the second signal by reference to recognition data representing a letter or sequence of letters of the alphabet.

31. A method as in claim 28 in which the second signal is a signal consisting of tones generated by a keypad.

32. A method as in claim 28 in which the second signal indicates the origin or destination of the second signal.

33. A method of speech recognition comprising:

- (a) receiving a speech signal;
- (b) storing the speech signal;
- (c) performing a recognition operation on the speech signal or some other signal; and
- (d) in the event of the recognition operation failing to meet a predetermined criterion of reliability, retrieving

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the stored speech signal and performing a recognition operation thereon.

34. An interactive voice recognition and response method for identifying at least one stored data base item comprising plural classes of mutually inter-related sub-items, said method comprising:

- (a) issuing a synthesized voice request for a first speech input representing a first class of sub-item;
- (b) performing speech recognition of said first speech input to identify at least one potentially corresponding first sub-item;
- (c) issuing a synthesized voice request for a second speech input representing a second class of sub-item;
- (d) compiling a list of second sub-items mutually inter-related with said identified first sub-item(s); and
- (e) performing speech recognition of said second speech input with respect to said compiled list to identify at least one potentially corresponding second sub-item from said list.

35. A method as in claim 34 wherein steps c and d are at least in part concurrently performed.

36. A method as in claim 34 wherein the speech recognition of step b is performed with respect to a sub-set of the first class of sub-items.

37. A method as in claim 36 wherein said sub-set is chosen based on an identified origin or destination location of said first speech input.

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